— POSTER —

The Use of *Agrobacterium rhizogenes* to Improve Rooting Capacity of Recalcitrant Eucalypt Clones*

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A three year study using *A. rhizogenes* or *rol* genes on binary vectors to improve the rooting capacity of selected eucalypt clones is nearing completion. The study has involved *E. nitens*, *E. globulus* and *E. regnans* tissue-cultured clones with varying capacities to form roots when treated with auxin. Coppice-derived shoot material of *E. globulus* has also been used in the study. We have shown that the majority of eucalypt clones are capable of being infected with *Agrobacterium* containing a binary vector carrying the GUS reporter gene fused to an appropriate promoter. Though there has been significant variation between different experiments involving the same eucalypt clones, it is clear that infection of shoots with wild type *A. rhizogenes* has had positive effects with respect to root formation when results are compared to auxin-only treatments. Plants containing *A. rhizogenes* induced roots were cultured for several weeks *in vitro* before transfer to soil. Transfer to soil was successfully achieved for ~60% of *A. rhizogenes* infected clones (twice weekly application of fungicide was essential) and plants have been maintained in a PH1 greenhouse for about two years. In contrast clones forming roots in response to IBA treatment were successfully transferred to compost in ~10-15% of cases. Some of the plants containing *A. rhizogenes* induced roots were uncharacteristically bushy during the first 6-9 months of growth but nevertheless were vigorous. In the second year, however, most plants grew to ~3 metres in height and their growth habit and leaf structure appeared to be morphologically normal. Many plants are characterised by a vigorous root system which radiates from the bottom of pots for 20-30 cm. This pattern is quite unlike that of normal seed-derived plants or tissue culture-derived plants which formed roots in response to auxin treatment.

We are continuing to analyse root tissues of these eucalypt plants to determine whether all roots are transgenic and whether any free-living agrobacteria exist in the soil. If no agrobacteria are detected, it may be possible to grow these chimaeric plants in open experimental sites to determine their growth rates and assess whether their altered root systems confer positive or negative effects with respect to productivity.

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